

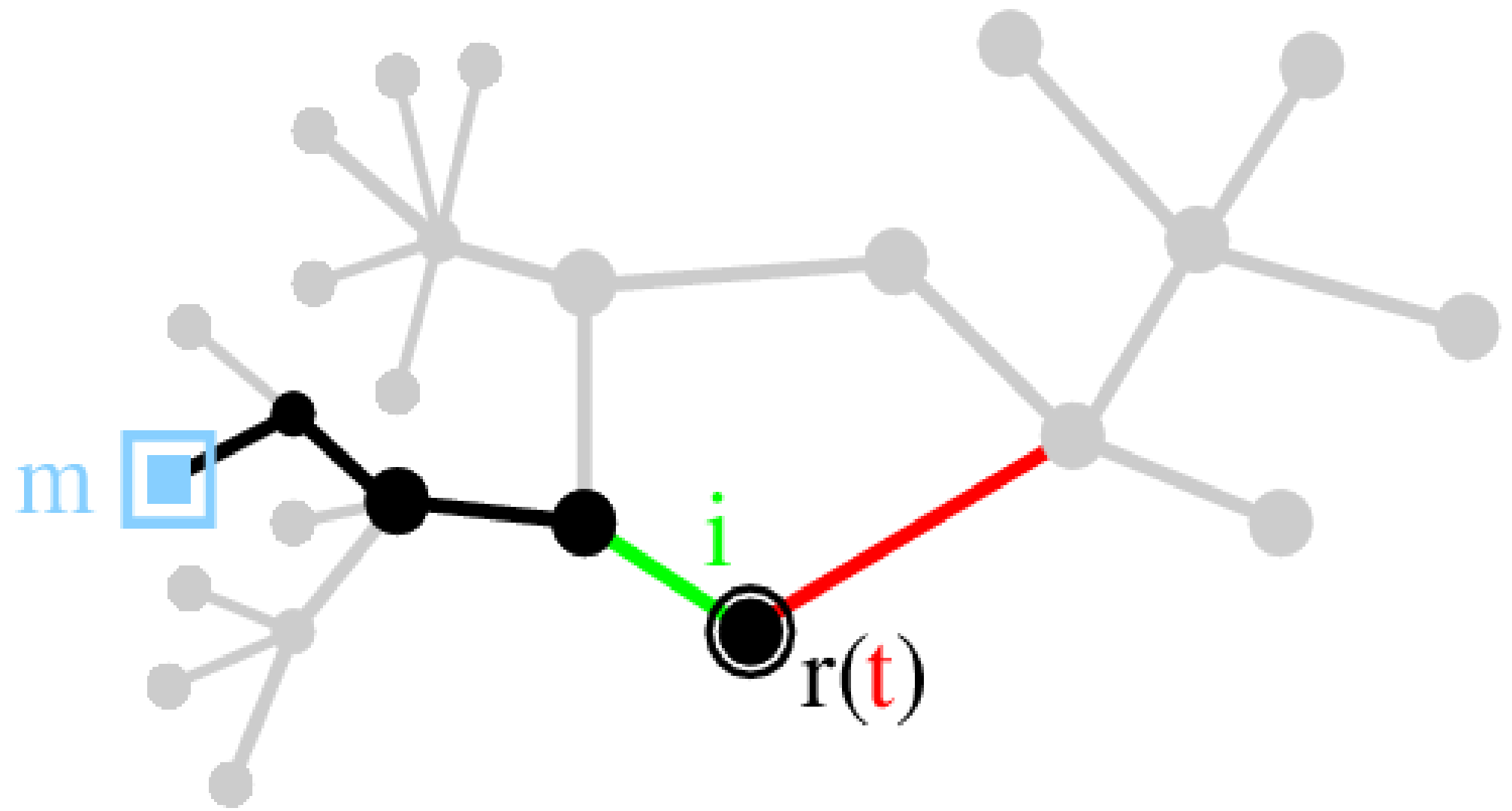
Distributed UDP Ping

- UDP Ping is a program executed on a monitor m that gives an interface i of a target router $r(t)$, depending on the location of the monitor.
- Using UDP Ping on a distributed set of monitors M , multiple interfaces (hopefully *all* the interfaces) of a target router are gathered.
- Counting the different interfaces observed gives the degree of this router, $deg(r(t))$.

UDP Ping

- A monitor m sends an UDP message towards an unallocated UDP Port towards a target address t .
- The router $r(t)$ that owns this address uses one of its interfaces, $i(m, r(t))$, to generate the ICMP Destination Unreachable message.
- The interface i depends of m .

UDP Ping



Distributed UDP Ping

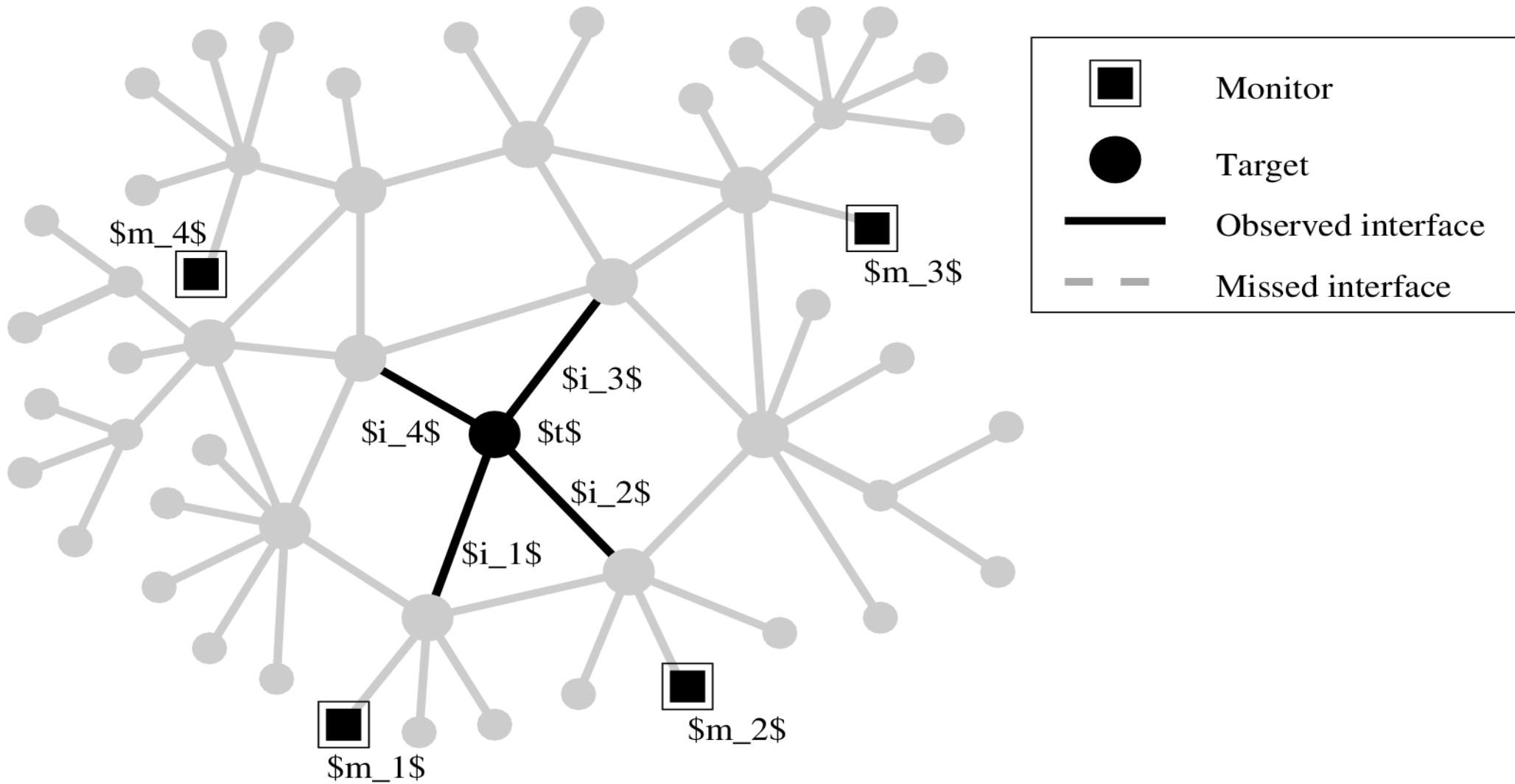
- Using multiple monitors, we collect different interfaces of a target $r(t)$:

$$M(r(t)) = \{ i(m, t) \mid m \text{ in } M \}$$

- If M is properly distributed, then $M(r(t))$ contains *all* the interfaces of $r(t)$.
- In this case,

$$|M(r(t))| = \text{deg}(r(t))$$

Distributed UDP Ping



Distributed UDP Ping

- Input :
 - A target address, t
 - A list of monitors, M
- Output :
 - A list of triplets (m, i, t) , such that i is the interface used by $r(t)$ to reply to m .
 - The size of $\{i \mid (m, i, t)\}$, which equals to $deg(r(t))$ if M is distributed enough.